



General Description

The SIR516DP-T1-BE3 use advanced SGT MOSFET technology to provide low $R_{DS(ON)}$, low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness.

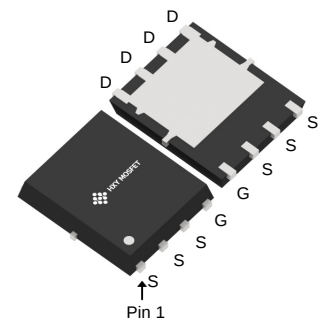
General Features

$V_{DS} = 100V$ $I_D = 75A$

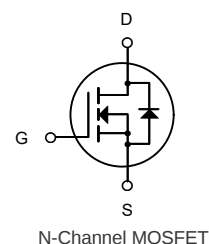
$R_{DS(ON)} < 7.5m\Omega$ @ $V_{GS}=10V$

Applications

Consumer electronic power supply Motor control
Synchronous-rectification Isolated DC
Synchronous-rectification applications



DFN5X6-8L
(Power(5x6))



Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
SIR516DP-T1-BE3	DFN5X6-8L(Power(5x6))	HXY MOSFET	5000

Absolute Maximum Ratings at $T_j=25^{\circ}C$ unless otherwise noted

Parameter	Symbol	Value	Unit
Drain source voltage	V_{DS}	100	V
Gate source voltage	V_{GS}	± 20	V
Continuous drain current ¹⁾	I_D	75	A
Pulsed drain current ²⁾	I_D , pulse	300	A
Power dissipation ³⁾	P_D	97	W
Single pulsed avalanche energy ⁵⁾	EAS	90	mJ
Operation and storage temperature	T_{stg}, T_j	-55 to 150	$^{\circ}C$
Thermal resistance, junction-case	$R_{\theta JC}$	1.3	$^{\circ}C/W$



Electrical Characteristics ($T_J=25^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
Off Characteristic						
V _{(BR)DSS}	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	100	-	-	V
I _{DSS}	Zero Gate Voltage Drain Current	V _{DS} =100V, V _{GS} =0V,	-	-	1.0	μA
I _{GSS}	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
On Characteristics						
V _{GS(th)}	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D =250μA	1.0	1.6	2.5	V
R _{DS(on)}	Static Drain-Source on-Resistance note3	V _{GS} =10V, I _D =20A	-	6.4	7.5	mΩ
		V _{GS} =4.5V, I _D =8A	-	9.2	11.4	mΩ
Dynamic Characteristics						
C _{iss}	Input Capacitance	V _{DS} =50V, V _{GS} =0V, f=1.0MHz	-	2944	-	pF
C _{Oss}	Output Capacitance		-	736	-	pF
C _{rss}	Reverse Transfer Capacitance		-	2.04	-	pF
Q _g	Total Gate Charge	V _{DS} =50V, I _D =30A, V _{GS} =10V	-	39.4	-	nc
Q _{gs}	Gate-Source Charge		-	5.6	-	nc
Q _{gd}	Gate-Drain(“Miller”) Charge		-	7.6	-	nc
Switching Characteristics						
t _{d(on)}	Turn-on Delay Time	V _{DD} =50V, I _D =25A, R _G =6Ω, V _{GS} =10V	-	13	-	nc
t _r	Turn-on Rise Time		-	27.5	-	nc
t _{d(off)}	Turn-off Delay Time		-	45.5	-	nc
t _f	Turn-off Fall Time		-	41.5	-	nc
Drain-Source Diode Characteristics and Maximum Ratings						
I _S	Maximum Continuous Drain to Source Diode Forward Current		-	-	75	A
I _{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	300	A
V _{SD}	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S =30A	-	-	1	V
t _{rr}	Body Diode Reverse Recovery Time	T _J =25°C, I _F =12A,dI/dt=100A/μs	-	177	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	1291	-	nc

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=50V$, $V_G=10V$, $R_G=25\Omega$, $L=0.5mH$, $I_{AS}=19A$

3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$



Typical Performance Characteristics

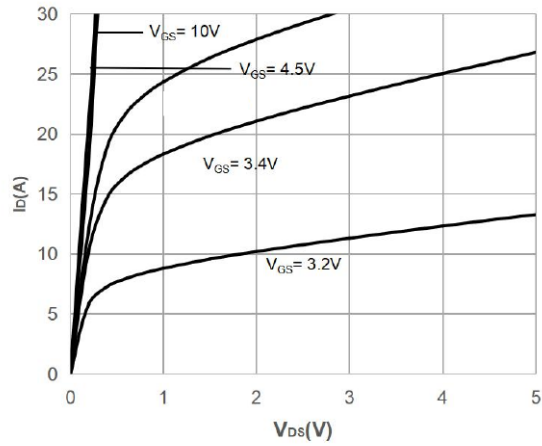


Figure 1: Output Characteristics

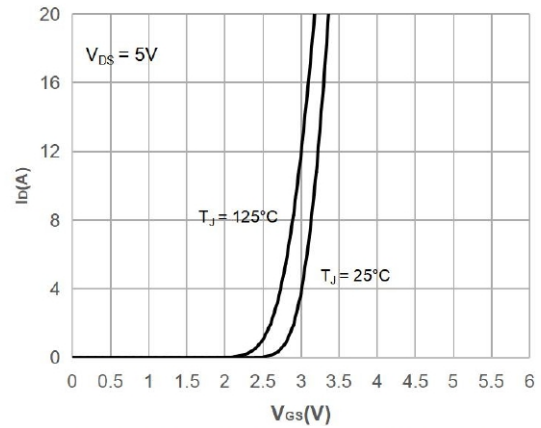


Figure 2: Typical Transfer Characteristics

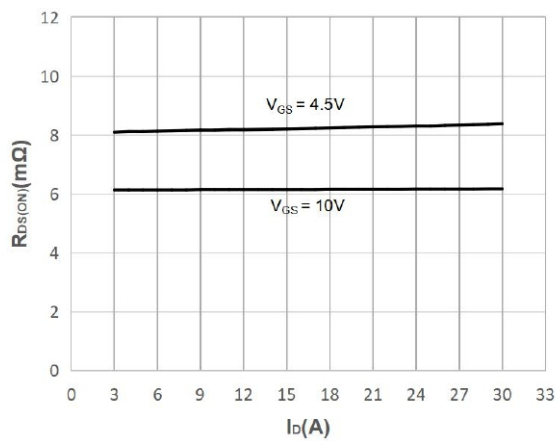


Figure 3: On-resistance vs. Drain Current

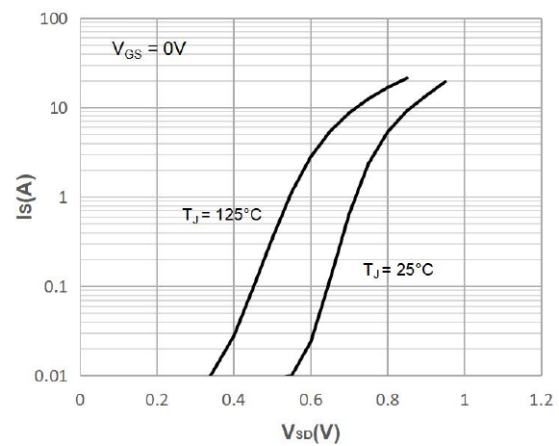


Figure 4: Body Diode Characteristics

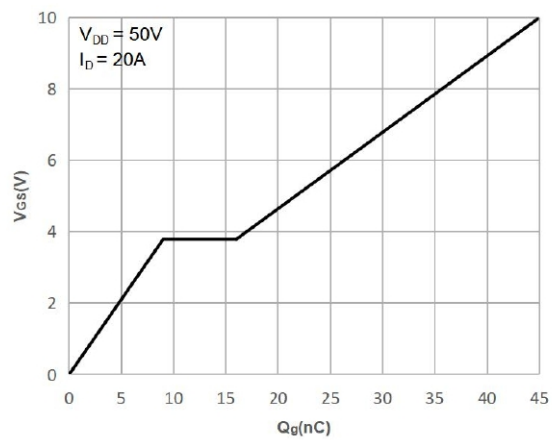


Figure 5: Gate Charge Characteristics

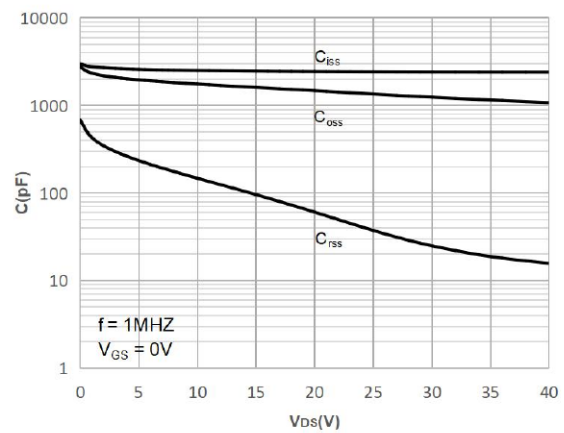


Figure 6: Capacitance Characteristics



Figure 7: Normalized Breakdown voltage vs. Junction Temperature

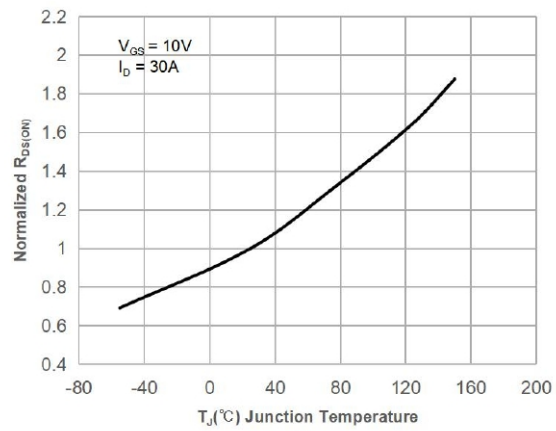


Figure 8: Normalized on Resistance vs. Junction Temperature



Figure 9: Maximum Safe Operating Area

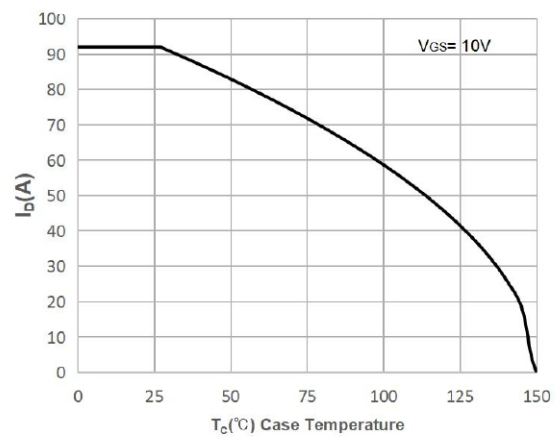


Figure 10: Maximum Continuous Drain Current vs. Case Temperature



Figure 11: Normalized Maximum Transient Thermal Impedance



Figure 12: Peak Current Capacity



DFN5X6-8L(Power(5x6)) Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010



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